

IN THE CLAIMS:

Claim 1 (Currently Amended): A liquid crystal display device, comprising:

a thin film transistor substrate, on which a plurality of data lines and gate lines are positioned perpendicular to each other;

a plurality of pixel electrodes formed near intersections of the data lines and the gate lines;

a color filter substrate ~~positioned parallel to the thin film transistor substrate,~~
including a color filter layer, a black matrix and a common electrode ~~formed thereon~~
bonded to the thin film transistor substrate;

a polymer wall arrangement formed on one of either ~~on~~ the thin film transistor substrate ~~or on~~ and the color filter substrate dividing the substrate into a plurality of liquid crystal panels; and

a plurality of liquid crystal injection openings formed on edge portions of the bonded color filter and thin film transistor substrates ~~each panel of the plurality of liquid crystal panels,~~

wherein each of the plurality of liquid crystal injection openings are arranged along vertical and horizontal line directions and correspond to each one of the plurality of liquid crystal panels.

Claim 2 (Original): The device of claim 1, wherein at least two liquid crystal injection openings are formed.

Claim 3 (Original): The device of claim 1, wherein the polymer wall arrangement is formed of a material such as a sealing agent.

Claim 4 (Original): The device of claim 1, wherein the polymer wall arrangement has a cross shape.

Claim 5 (Original): The device of claim 1, wherein the polymer wall arrangement comprises at least one polymer wall which is formed parallel to a side of the thin film transistor substrate or the color filter substrate.

Claim 6 (Original): The device of claim 1, wherein the polymer wall arrangement is formed close to the black matrix.

Claim 7 (Currently Amended): A liquid crystal injection method, comprising:

forming a polymer wall arrangement ~~on a substrate~~ between bonded first and second substrates;

dividing the ~~substrate~~ bonded first and second substrates into a plurality of liquid crystal panels by the polymer wall arrangement;

connecting a plurality of liquid crystal injection openings formed on edge portions of the ~~substrate~~ bonded first and second substrates and liquid crystal supply sections to the plurality of liquid crystal panels;

generating a vacuum inside at least one panel of the plurality of liquid crystal panels by pumping through at least one liquid crystal injection opening of the plurality of liquid crystal injection openings to create a high vacuum state in the panel;

defoaming liquid crystal in a defoamation pressing tank; and

injecting the liquid crystal from the defoamation pressing tank to the panel through at least one liquid crystal injection opening of the plurality of liquid crystal injection openings,

wherein each of the plurality of liquid crystal injection openings are arranged along vertical and horizontal line directions.

Claim 8 (Original): The method of claim 7, wherein the vacuum level inside of the plurality of liquid crystal panels is higher than that of the defoamation depressing tank after the pumping is performed.

Claim 9 (Original): The method of claim 7, wherein the vacuum level inside of the plurality of liquid crystal panels is about 10^{-6} torr.

Claim 10 (Original): The method of claim 7, wherein the vacuum level inside of the defoamation pressing tank is about 10^{-3} torr.

Claim 11 (Original): The method of claim 7, wherein the substrate is one of a thin film transistor substrate and a color filter substrate.

Claim 12 (Original): The method of claim 7, further comprising forming the polymer wall arrangement of a material such as a sealing agent.

Claim 13 (Original): The method of claim 7, wherein the polymer wall arrangement has a cross shape.

Claim 14 (Original): The method of claim 7, further comprising forming the polymer wall arrangement close to a black matrix.

Claim 15 (Currently Amended): A method for manufacturing a liquid crystal display device, comprising:

~~arranging a thin film transistor substrate parallel to a color filter substrate, wherein the color filter substrate has a color filter layer, a black matrix and a common electrode;~~

forming a polymer wall arrangement, ~~either on the~~ on one of a thin film transistor substrate ~~or on the~~ and a color filter substrate, ~~which divides the substrate into to provide~~ a plurality of smaller liquid crystal panels;

forming a liquid crystal injection opening on each of the small liquid crystal panels along edge portions of the one of the thin film transistor substrate ~~or~~ and color filter substrate;

bonding the thin film transistor substrate to the color filter substrate;

generating a vacuum inside of the ~~substrate~~ bonded substrates by pumping the liquid crystal injection openings;

defoaming a liquid crystal inside of a defoamation pressing tank; and

injecting the liquid crystal from the tank into the ~~substrate~~ bonded substrates through at least one of the liquid crystal injection openings,

wherein each of the plurality of liquid crystal injection openings are arranged along vertical and horizontal line directions.

Claim 16 (Original): The method of claim 15, further comprising forming a spacer in the substrate.

Claim 17 (Original): The method of claim 15, further comprising forming the polymer wall arrangement of a material such as a sealing agent.

Claim 18 (Original): The method of claim 15, wherein the polymer wall arrangement has a cross shape.

Claim 19 (Original): The method of claim 15, further comprising forming the polymer arrangement close to a black matrix.

REMARKS**Summary of the Office Action**

Claims 1, 3-7, and 11-19 stand rejected under 35 U.S.C. § 103(b) as being anticipated by Yamazaki et al. (US 6,099,672) in view of Tanaka et al. (US 6,137,559).

Claims 1-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Related Art in view of Ma et al. (US 6,285,434) and Tanaka et al.

Summary of the Response to the Office Action

Applicants have amended claims 1, 7, and 15 in accordance with the Examiner's comments in the Advisory Action dated September 16, 2003. Accordingly, claims 1-19 are pending for consideration.

Claims Define Allowable Subject Matter

Claims 1, 3-7, and 11-19 stand rejected under 35 U.S.C. § 103(b) as being anticipated by Yamazaki et al. (US 6,099,672) in view of Tanaka et al. (US 6,137,559). Applicants respectfully traverse the rejection as being based upon a combination of prior art references that neither teaches nor suggests the novel combination of features recited in amended independent claims 1, 7, and 15, and hence dependent claims 2-6, 7-14, and 16-19.

Independent claim 1, as amended, recites a plurality of liquid crystal injection openings "formed on edge portions of the bonded color filter and thin film transistor substrates." Similarly, independent claim 7, as amended, recites a step of connecting a plurality of liquid crystal injection openings formed on edge portions of "the bonded first and second substrates," and independent claim 15, as amended, recites a step of forming a liquid crystal injection opening on each of the small liquid crystal panels "along edge portions of the one of the thin film

transistor substrate and color filter substrate.” In contrast to Applicants’ claimed invention, the seal openings 315-318 taught by Yamazaki et al. are formed at an offset distance from edge portions of the panel 301. Similarly, the respective openings of the seal patterns 6 taught by Tanaka et al. are each formed at an offset distance from edge portions of the glass substrate 1. Accordingly, Applicants respectfully submit that Yamazaki et al. and Tanaka et al., whether taken singly or combined, neither teach nor suggest Applicants’ claimed features of independent claims 1, 7, and 15, and hence dependent claims 2-6, 8-14, and 16-19.

Claims 1-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants’ Related Art FIGs. 1-3 in view of Ma et al. (US 6,285,434) and Tanaka et al. Applicants respectfully traverse the rejection as being based upon a combination of Applicants’ Related Art and a prior art reference that neither teaches nor suggests the novel combination of features recited in amended independent claims 1, 7, and 15, and hence dependent claims 2-6, 7-14, and 16-19.

As detailed above, independent claims 1, 7, and 15, as amended, each recite that a plurality of liquid crystal injection openings are formed along edge portions of substrates. In contrast to Applicants’ claimed invention, Applicants’ Related Art FIG. 3, for example, shows a panel having only a single injector connector 11. Likewise, Ma et al. discloses in FIGs. 2-5 filling independent cells of bonded substrates 200 and 221 using first and second liquid crystal materials located at opposite edges of the substrates 200 and 221 to form a multicolor LCD device. Similarly, the respective openings of the seal patterns 6 taught by Tanaka et al. are each formed at an offset distance from edge portions of the glass substrate 1. Accordingly, Applicants respectfully submit that Applicants’ Related Art FIGs. 1-3, Ma et al., and Tanaka et al., whether

taken individually or in combination, neither teach nor suggest Applicants' claimed features including a plurality of liquid crystal injection openings are formed along edge portions of substrates, as recited by independent claims 1, 7, and 15, and hence dependent claims 2-6, 8-14, and 16-19.

For at least the above reasons, Applicants respectfully submit that claims 1-19 are neither taught nor suggested by any of the applied prior art references, whether taken alone or in combination. Applicants respectfully assert that the rejections under 35 U.S.C. § 103(a) should be withdrawn because the above-discussed novel combination of features are neither taught nor suggested by any of the applied references, whether taken alone or in combination.


CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims. Should the Examiner believe that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative to expedite prosecution.

If there is any fee due in connection with the filing of this Amendment, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

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